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10/577,223	07/26/2006	Hans-Peter Brack	5026-1001	3418
466	7590	05/23/2011		
YOUNG & THOMPSON			EXAMINER	
209 Madison Street			WOOD, JARED M	
Suite 500				
Alexandria, VA 22314			ART UNIT	PAPER NUMBER
			1731	
			NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DocketingDept@young-thompson.com

Office Action Summary	Application No. 10/577,223	Applicant(s) BRACK ET AL.
	Examiner JARED WOOD	Art Unit 1731

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 25 October 2010.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 13-17 and 19-38 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 13-17 and 19-38 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-942)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date _____
- 4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date _____
- 5) Notice of Informal Patent Application
- 6) Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/25/2010 has been entered.

Claims 1-12, 18, and 30 are cancelled. Claims 13-17, 19-29, and 31-38 are currently pending for examination.

Claim Objections

Claim 24 is objected to because of the following informalities:

In line 4 a space should appear between “to” and “150” and a “°” should appear before the “C”. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 32 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that

the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 32 requires that the ion conducting membrane be a polar and hydrogen-bonding solvent.

There is no disclosure in applicant's specification or in the originally filed claims to support such a limitation. Previously applicant had indicated original claim 23 as support for this limitation.

However, original claim 23 describes the electrode layer and makes no mention of the ion conducting membrane.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 13, 16, 19, 21, 26, 31, 32, 35, and 36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 13, Line 4 reads "swelling an ion-conducting membrane by subjecting to a liquid..." Due to a grammatical error, it is unclear what is subjected to the liquid in this step. For purpose of examination this will be interpreted to mean that the membrane is subjected to a liquid.

Claim 16 recites the limitation "the grafting solution" in line 2. There is insufficient antecedent basis for this limitation in the claim. Claim 16 further compares the crosslinker content to styrene. However, no other mention of styrene is made to indicate or require the presence of styrene in the solution.

Claim 19 further compares the crosslinker content to styrene. However, no other mention of styrene is made to indicate or require the presence of styrene in the solution.

Claim 21 recites the limitation "the swelling step" in line 6. There is insufficient antecedent basis for this limitation in the claim.

In claim 26, line 8 reads "wherein the ion-conducting membrane in a pre-swollen status prior to the hot-pressing." Due to a grammatical error, it is unclear what is meant by this phrase. For purpose of examination this will be understood to mean that at a point prior to hot-pressing, the membrane is in a pre-swollen status.

Claim 31 further compares the crosslinker content to styrene. However, no other mention of styrene is made to indicate or require the presence of styrene in the solution.

Claim 32 requires that the membrane is a solvent. It is unclear what is meant by this claim since it is inconsistent with generally accepted definitions of the term "membrane" such as those provided by thefreedictionary.com, reproduced below for applicant's convenience:

mem·brane 

1. *Biology*
 - a. A thin, pliable layer of tissue covering surfaces or separating or connecting regions, structures, or organs of an animal or a plant.
 - b. Cell membrane.
2. A piece of parchment.
3. *Chemistry* A thin sheet of natural or synthetic material that is permeable to substances in solution.

Claim 35, requires that the electrode layer is a polar and hydrogen-bonding solvent. Since applicant has indicated original claim 23 for support for this limitation and original claim 23 required that the electrode layer be one of carbon cloth, carbon paper, or carbon felt, it is unclear how such materials can be provided as a polar and hydrogen bonding solvent.

Claim 36 further compares the crosslinker content to styrene. However, no other mention of styrene is made to indicate or require the presence of styrene in the solution.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless —

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 13-16, 19, 21-29, 31, 33, 34, and 36-38 rejected under 35 U.S.C. 102(b) as being anticipated by *Radiation-grafted membrane/electrode assemblies with improved interface* (Huslage et al.).

As to claims 13, 21, 26, and 37, Huslage discloses a method for producing a membrane electrode assembly (MEA) comprising providing an FEP film (ion conducting copolymer of polytetrafluoroethylene and polyhexafluoropropylene) exposing the film to electron-beam irradiation, exposing the film to a solution comprising styrene (ionomer) and divinylbenzene (DVB) (crosslinker) in EtOH or isopropanol/water (solvent) (swelling step), sulphonating the membrane with chlorosulphonic acid, surface coating the grafted membrane with Nafion by immersion in a Nafion solution. The swelled, coated membrane is then dried at room temperature and then at 130 °C. The dried membrane is then re-swelled by boiling in deionized water. The re-swelled membrane is then combined with ELAT-electrodes and is then hot-pressed at 40-50 bar (4-5 MPa) and 115 °C for 3 minutes (180 seconds) to form the MEA (pg. 248-249, section 2).

As to claim 14, Huslage discloses providing an FEP film (ion conducting copolymer of polytetrafluoroethylene and polyhexafluoropropylene) exposing the film to electron-beam

irradiation, exposing the film to a solution comprising styrene (ionomer) and divinylbenzene (crosslinker) in EtOH or isopropanol/water (solvent) (radiation grafted) (pg. 248-249, section 2).

As to claims 15, 29, and 36, Huslage discloses exemplary graft levels of 20% and 15% (table 2). Further applicant states on page 2, lines 18-31 that the membranes of Huslage typically have graft levels of 18-20%.

As to claims 16, 19, 31, and 36, Huslage discloses that the ratio of styrene (104.15 g/mol) to DVB (130.19 g/mol) of 9:1 which would correlate with a DVB (crosslinker) content in the solution of ~12% relative to styrene (pg. 248-249, section 2).

As to claims 22, 23, and 28, although Huslage does not expressly disclose that the catalytic layer is disposed between the electrode layers and the ion conducting membrane or the specific materials used to form the electrode layers, Huslage does disclose the use of ELAT-electrodes which are a carbon cloth material which has a layer of catalyst deposited on a single side of the cloth and wherein the catalyst side of the cloth is located adjacent to the membrane during MEA assembly.

As to claims 24 and 33, Huslage discloses hot-pressing at 40-50 bar (4-5 MPa) and 115 °C for 3 minutes (180 seconds) to form the MEA (pg. 248-249, section 2).

As to claim 25, Huslage discloses that the catalyst material on the electrode layers is Pt (pg. 248-249, section 2).

As to claims 27 and 34, Huslage's FEP film has an initial thickness of 25 µm and a swelled thickness of 34 µm (pg. 248-249, section 2).

As to claim 38, Huslage discloses that the membrane is in the swollen state (wet) at the start of hot-pressing (pg. 248-249, section 2).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Radiation-grafted membrane/electrode assemblies with improved interface* (Huslage et al.) in view of US 6,465,120 (Akita et al.).

The limitations of claim 13 are met by Huslage as presented above. While Huslage discloses treating a Nafion membrane with HNO₃ for 1 hour and subsequently washing with water, Huslage does not expressly disclose that the same treatment is given to his FEP membrane prior to processing.

Akita discloses treating a Nafion membrane prior to processing with sulfuric acid (strong acid) and washing with water to remove any inorganic impurities and metal ions contained in the membranes (col. 3, ln. 65-col. 4, ln. 10).

It would have been obvious to one of ordinary skill in the art at the time of invention, in view of the disclosures of both Huslage and Akita, to submit Huslage's FEP membrane to an strong acid treatment and subsequent washing with water to remove any residual undesirable organic impurities and metal ions which may be in/on the membrane (Huslage: pg. 248-249, section 2; Akita: col. 3, ln. 65-col. 4, ln. 10).

Response to Arguments

Applicant's arguments with respect to claims 13-17 and 19-38 have been considered but are moot in view of the new ground(s) of rejection. The examiner has determined that the Momose disclosure was insufficient to reject at least claim 13 since the TFS which the membrane is immersed in is not disclosed to contain a solvent as required by claim 13. As such, a new ground(s) of rejection is provided above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JARED WOOD whose telephone number is (571)270-5911. The examiner can normally be reached on Monday - Friday, 7:30 am - 5:00 pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571)272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JARED WOOD/
Examiner, Art Unit 1731

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1731